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STATE OF MONTANA



DEPARTMENT OF STATE LANDS

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July 10, 1978

PLEASE RETURN

Attached is a Preliminary Environmental Review (PER) for the approval of a Deep Mining Permit for Beartooth Coal Company Inc., of Billings, Montana. The applicant wishes to reopen an underground coal mine in the Bearcreek area of Carbon County, Montana. Contents of this PER are those required by the Montana Environmental Policy Act (Chapter 65, Title 69, R.C.M. 1947) and the Department's rules adopted pursuant thereto (Title 26, Chapter 2, Subchapter 18 of A.R.M.).

All materials submitted to the Department by Beartooth Coal Company as part of its application for an underground mining permit pursuant to the requirements of the Strip and Underground Mine Reclamation Act (Title 50, Chapter 10, R.C.M. 1947) are on file and available for public review in the Department's offices.

The review indicates that the issuance of the permit to Beartooth Coal Company Inc. does not constitute an action which might significantly affect the quality of the human environment and therefore a draft Environmental Impact Statement (EIS) will not be issued by the Department. This PER is being circulated for public information purposes only.

If you have any questions or need additional information, please contact this office.

Sincerely,


Timothy E. Gallagher
Research Specialist

jb

Attachment

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PRELIMINARY ENVIRONMENTAL REVIEW

for the Proposed Granting of an Underground Mining Permit to
Beartooth Coal Company Incorporated
for the reopening of an Underground Coal Mine in the area of
Bearcreek, Carbon County, Montana

Department of State Lands

Helena, Montana

July 10, 1978

An Underground Mining Permit is issued pursuant to Section 50-1041, R.C.M. 1947.

This PER was prepared in accordance with the rules adopted
by the Department of State Lands pursuant to the
Montana Environmental Policy Act (MEPA)
Chapter 65, Title 69, R.C.M. 1947.

PRELIMINARY ENVIRONMENTAL REVIEW

APPLICANT Beartooth Coal Company Inc.

TYPE OF OPERATION Underground Coal Mine

LOCATION Section 6, T8S, R21E; Section 31, T7S, R21E and Section 36, T7S, R20E
Carbon County, Montana

PERSON PREPARING P.E.R. Tim Gallagher, Research Specialist, Department of State Lands

APPLICATION COMPLETE _____ P.E.R. COMPLETE July 10, 1978

PHYSICAL ENVIRONMENT	POTENTIAL IMPACTS			AMPLIFICATION REFER TO:
	SIGNI- FICANT	INSIGNI- FICANT	UNKNOWN	
1. <u>TOPOGRAPHY</u>		X		P 4,5
2. <u>GEOLOGY</u> ; stability	X			P 6
3. <u>SOILS</u> ; Quality, Distribution		X		P 6,7
4. <u>WATER</u> ; Quality, Quantity Distribution	X			P 8,9
5. <u>AIR</u> ; Quality			X	P 9,10
6. <u>UNIQUE, ENDANGERED, FRAGILE, or LIMITED</u> environmental resources		X		

BIOLOGICAL ENVIRONMENT

1. <u>TERRESTRIAL, AVIAN, and AQUATIC</u> ; species and habitats		X		P 10,11,12
2. <u>VEGETATION</u> ; quantity, quality, species		X		P 12,13,14 15
3. <u>AGRICULTURE</u> ; grazing, crops, production		X		P 12,13,14 15

HUMAN ENVIRONMENT	POTENTIAL IMPACTS			AMPLIFICATION REFER TO:
	SIGNIFICANT	INSIGNIFICANT	UNKNOWN	
1. <u>SOCIAL</u> structures and mores		X		
2. <u>CULTURAL</u> uniqueness, diversity		X		
3. <u>POPULATION</u> ; quantity and distribution		X		
4. <u>HOUSING</u> ; quantity and distribution		X		
5. <u>HUMAN HEALTH & SAFETY</u>	X			P 15,16
6. <u>COMMUNITY & PERSONAL INCOME</u>		X		P 16,17,18
7. <u>EMPLOYMENT</u> ; quantity and distribution		X		P 16,17,18
8. <u>TAX BASE</u> ; local & state tax revenue	X			P 16,17,18
9. <u>GOVERNMENT SERVICES</u> ; demand on		X		
10. <u>INDUSTRIAL, COMMERCIAL and AGRICULTURAL</u> activities		X		
11. <u>HISTORICAL & ARCHAEOLOGICAL</u>		X		P 18
12. <u>AESTHETICS</u>		X		P 19
13. <u>ENVIRONMENTAL PLANS</u> and <u>GOALS</u> local and regional		X		
14. <u>DEMANDS</u> on <u>ENVIRONMENTAL RESOURCES</u> of land, water, air and energy		X		
15. <u>TRANSPORTATION</u> networks & traffic flows		X		P 19

RECOMMENDATION CONCERNING PREPARATION OF AN EIS A draft EIS is not required as the proposed action does not constitute an action which might significantly affect the quality of the human environment.

OTHER GROUPS OR AGENCIES CONTACTED OR WHICH MAY HAVE OVERLAPPING

JURISDICTION: Department of Health and Environmental Sciences - Water Quality Bureau and Air Quality Bureau; Historical Preservation Office; Labor and Industry Safety and Health Bureau

INDIVIDUALS OR GROUPS CONTRIBUTING TO THIS PER:

Mike Bishop, Neil Harrington, JoAnn Vorozilchak

I. Introduction

The Beartooth Coal Company Incorporated, 310 Securities Building, Billings, Montana 59101 has applied to the Montana Department of State Lands for an Underground Mining Permit to reopen the old Brophy Mine (closed in 1959) in Virtue Gulch, Carbon County, Montana. The mine is located in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 31, Township 7 South, Range 21 East, the SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 36, Township 7 South, Range 20 East and the NW $\frac{1}{4}$ NW $\frac{1}{4}$ of Section 6, Township 8 South, Range 21 East, all in Carbon County, Montana. The mine is located about three miles east, southeast of Red Lodge, Montana (Figure 1). The projected underground coal mine and associated operations are on property that was extensively modified at certain locations during operations at the Brophy Mine until its closure in 1959.

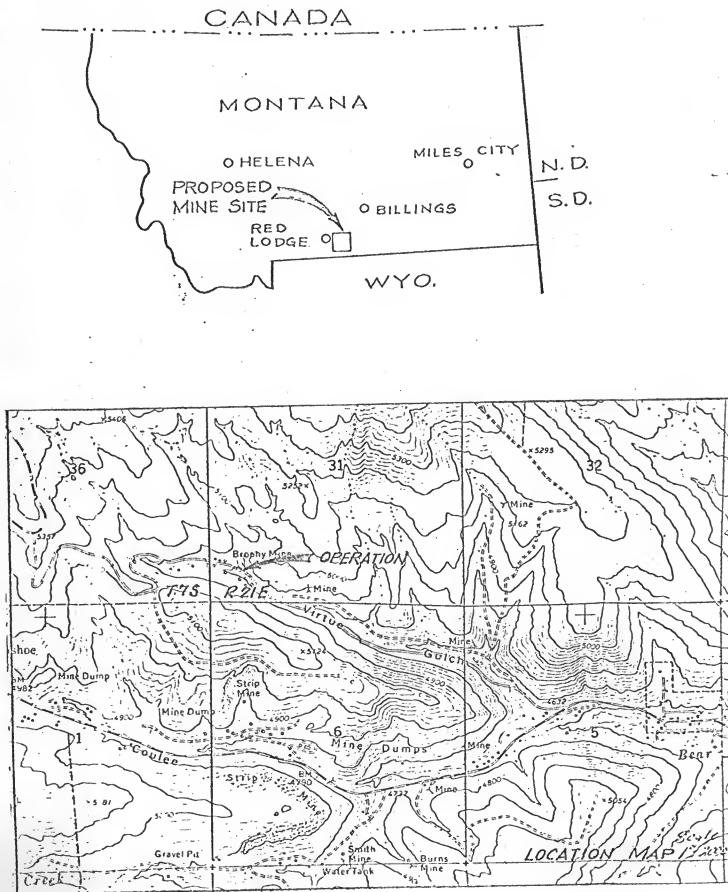
Surface rights are owned by H. D. Bischoff, Lovell, Wyoming. Mineral rights are owned by Red Lodge-Bearcreek Coal Partners and are leased to Beartooth Coal Company, Incorporated.¹

Beartooth Coal wishes to utilize the existing vent shaft and existing drift (entrance tunnel) with some modifications. The drifts have collapsed to an unknown extent due to the low bearing strength of the overlying rock strata accelerated by neglect and decomposition.

Coal would be mined by the basic room and pillar method, supplemented by the conventional mining method, although technological advances and actual underground conditions may cause revision of this plan in the future. Utilizing the room and pillar method, selected coal pillars may be removed at the completion of mining in a particular area to increase the amount of coal recovered and to collapse the roof on retreat from the area. This relieves the pressure on the mine's roof, therefore minimizing the possibility of catastrophic roof failure in other sections of the mine. Conventional mining on the other hand utilizes a coal cutter, which is similar to a chain saw, to undercut the coal face which is then drilled and finally blasted.² These processes should not cause surface disturbance in the form of



Figure 1



subsidence provided the coal bed that is removed is deep or thin. The coal seam Beartooth proposes to mine is believed to be at least five feet thick throughout the proposed mine area. It also becomes progressively deeper since mining operations will proceed into a hill and downward.¹

Beartooth expects their operation to produce between 8,000 to 25,000 tons of coal per week for 32 years, some of which may be available for local use for oil factories, sugar beet plants, cement plants, farmers and ranchers.⁹ The bulk, however, will be sold to public utility companies in the northwest area. The existing coal seam has a sulfur content between .89 percent and 1.5 percent. The BTU content falls within the 11,000 to 12,000 range with a low moisture content of 10 to 11 percent.

The proposed permit area encompasses approximately 100 acres approximately 30 of which fall within the active use area and will be reclaimed by revegetation where applicable (Figure 3).

Grazing is the dominant form of land use in the area. The most crucial determinant of the actual effect on local agriculture will be the ability of the coal company to reclaim the land after mining. Beartooth Coal Company has stated that it is firmly committed to require a return of the land to its former state, the productivity of which should at least meet and possibly exceed that now in existence.

II. Legal Concerns

The Department of State Lands (DSL) administers the Montana Strip and Underground Mine Reclamation Act (Title 50, Chapter 10, R.C.M. 1947). The Reclamation Act specifies that "an operator may not engage in strip or underground mining (for coal or uranium) without first having obtained from the Department a permit . . ." (Section 50-1039). Underground mine permits are issued for five-year periods and may be renewed upon each five-year anniversary upon application to the Department, so long as the operator is in compliance with the requirements of this act, the rules hereunder and the reclamation



plan provided for in Section 50-1043. Permit amendments may also be issued which have the same operator application and Department review requirements as do original permits.

Rules implementing the Montana Environmental Policy Act require that a Preliminary Environmental Review (PER) be prepared on certain departmental actions in order to determine whether they will have a significant effect on the human environment (MAC 26-2.2(18)-P280). If such a significant effect is determined, a draft Environmental Impact Statement (EIS) will be prepared.

The law requires mine operators to obtain a permit from the state providing for the reclamation of mined land. A bond of \$200 to \$2,500 per acre must be filed with DSL. A permit may be enforced by DSL through forfeiture of bond or civil penalties. DSL has implemented rules pursuant to the Strip and Underground Mine Reclamation Act.

III. Physical Environment

A. Topography

The terrain of the area has great relief and is very steep and rough. Within a two-mile radius around the proposed mine site, the maximum elevation is 5,890 feet above sea level at the extreme western edge of the area, and the minimum elevation is 4,578 feet at Bearcreek, Montana. The permit area is pocked with cave-ins of old mine shafts. Many areas have sloughed off due to the steepness of the terrain and unstable soils. The major drainage of the area is Bear Creek which flows east. The three minor drainages are Scotch Coulee, Virtue Gulch and Foster Gulch. These flow easterly into Bear Creek (Figure 2). The proposed mine is within the confines of Virtue Gulch exclusively.

In its preparatory steps toward mining, Beartooth Coal Company has excavated the existing mine entrance and vent shaft entrance to meet safety standards. This preliminary excavation will have little impact on the area provided adequate reestablishment of vegetation is attained.



A

B

C

D

Figure 2

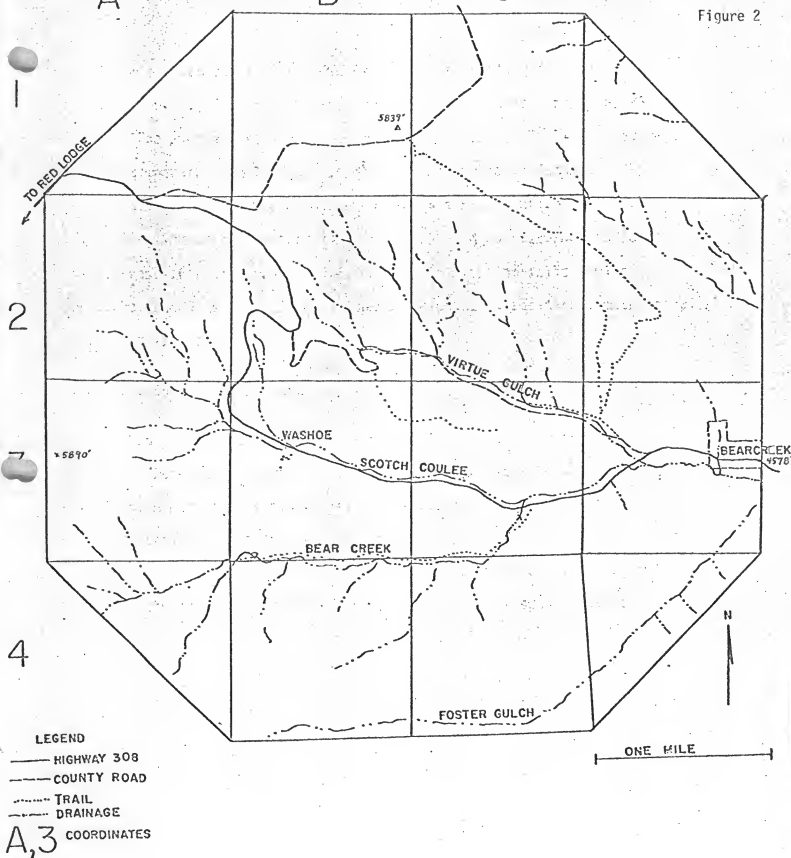


Figure 2. Map of Study Area.

B. Geology

The lease area held by Beartooth Coal is underlain by six numbered and two stray coal beds.¹ The beds are not continuous, and a maximum of five beds have been found in any one single drill hole. The coal beds logged were more than 3.5 feet thick. They tend to increase in thickness towards the south and west. The veins, according to the test holes, are generally 80 to 170 feet apart and are somewhat fragmented. Fragmentation and varying dips are typical of these mountain coal fields. The formations between the seams is generally shale varying in some cases from silty shale to hard sandstone.

Of the five coal seams logged, the uppermost coal seam #1 is not present in the permit application area. The next coal seam downward in the lithologic section (seam #1½) is present over approximately 40 percent of the mining area; however, the seam is too shallow to consider for underground mining methods. Seam #2, the next seam down in the lithologic section, is 7.5 feet thick at the portal area and believed to be at least five feet thick throughout the proposed mine area. This is the seam of coal on which Beartooth Coal Company proposes to initiate mining. There are three other seams of coal below #2 that could possibly be mined at a later date. These seams would be unaffected by Beartooth Coal Company's proposed mining of the #2 seam.

The proposed underground coal mining operation is located on a surface that was modified extensively and intensively in places during previous operations of the Brophy Mine. These prior disturbances occurred mainly along the alluvial filled drainages.

Upon completion of mining and eventual retreat from the mine with the room and pillar method, overlying strata will be jumbled. Any resource contained within such strata will become permanently unretrievable. In any area of shallow overburden, some minor surface disturbances may occur.

C. Soils

The soils of the area may be classified in a Wayden-Cabba-Rentsac Association: strongly sloping to steep, shallow, well-drained, clay loams, silty clay loams and

channery loams. The topsoil subsoil varies in thickness from one to four feet, and coverage soils are generally of a sandy clay loam. Permeability is moderate. Run-off is rapid, and the hazard of erosion is severe. Drainages are deep and form a dendritic pattern. Some stream channels may have cut into the bedrock in the permit area.

A soil overburden analysis has been done on samples from the Brophy Mine area which delineated the chemical and mechanical composition of the soil (Appendix A-1 and A-2). Of the samples taken on undisturbed sites, no unusual characteristic surfaced. However, the spoil sample analysis showed an unexpected pH of 3.0 in a high concentration of sand (94 percent) (Appendix A-3).

Soil is considered one of the major and most extensive natural resources in this area since the production of cash crops and especially livestock depends upon it. The topsoil, therefore, would be segregated, stockpiled and protected from wind and water erosion or contaminants. Stockpiled topsoil would be seeded or planted with an effective cover of non-noxious, quick-growing annual and perennial plants during the first normal period for favorable planting conditions or protected by other approved measures as specified in section S10340 (History: Section 30-1037, R.C.M. 1947; IMP, Section 50-1045, R.C.M. 1947; Emergency Administrative Effects 03/31/78). Disturbed areas no longer required for the conduct of mining operations would be regraded. Topsoil would be distributed and the area revegetated with a Department approved seeding mixture (Appendix B).

Beartooth would also bury under adequate fill (at least eight feet) all toxic materials, shale, minerals or any other material determined by the DSL to be acid-producing, toxic, undesirable or creating a hazard.¹ The permit rules also call for adequate sealing of all portals, entryways, drifts, shafts or other openings between the surface and underground mine workings upon abandonment, with available stockpiled overburdens.

D. Water

Surface water flow in the proposed contract area is minimal. The major drainage in the area, Virtue Gulch, can be described as ephemeral, with water from it being quite minimal during most of the year (estimated flow = 3 cfs). It has been noted that during periods of heavy rains this small stream turns black (from old coal mine spoils) and has reached peak flows approaching three feet in depth for short periods.¹

Rainfall in the Red Lodge area is reported to be 22 inches per year. Whereas in the Bearcreek permit area, it is reported to be six to eight inches per year with most precipitation following in April, May and June. Average annual snowfall for Red Lodge is about 97 inches, and the mean annual temperature is 42.1° F.³ Snowfall and mean annual temperature are not available for permit area.

Water-born products of erosion such as silts and fines can have far reaching effects on streams with fish populations. Virtue Gulch hydrology study at three sampling stations within and around the permit area indicated only 10 species of benthic (bottom-dwelling) invertebrates and absolutely no traces of fish. Excess water and erosion in this proposed mine area is not likely to become a problem since Beartooth permit plans call for interceptor ditches parallel to the major drainage slopes and sediment control dams. This design should more than accommodate maximum runoffs for a 10-year, 24-hour precipitation event.¹ All sediment would thus be controlled in the vicinity of the disturbed area, and no ponds are planned at this time. There will be no degradation of public water unless approved by the regulatory authority.

A chemical pollutant could originate from water leaching of chemical products originating in the coal or overburden. This could affect the quality of the water and create what is commonly termed "acid mine drainage."⁴ Core samples from the coal overburden, as well as mine water samples, do not indicate significant concentrations of any noxious element or potential acid-mine drainage problems in the immediate permit area. Although the water analysis does show an unusually high concentration

of sulfate (SO_4), the pH is 7.6 (Appendix C). Regulations requiring regular analysis of mine water are to be followed to ensure that, if any unexpected toxic waste develops, immediate treatment in a holding pond or tank can be initiated. Prior to releasing, pumping, or draining any water from the mine or adjacent lands or into state waters, Beartooth must obtain a Montana Pollutant Discharge Elimination System (MPDES) waste discharge permit from the Department of Health and Environmental Sciences, Water Quality Bureau.

Quality of water is a major consideration not only in pumping and surface disposal, but also in relation to what effect removal of such a body of water would have on the surrounding wells and underground water supply system. The slow rate of movement of underground water may delay the appearance of such effects until some years hence. There is no way to predict this effect at this time. One well is located on the proposed permit area and another active well about two miles southeast of the mine.

Actual quantity of mine water or its relative flow or abundance have not been and will not be determined until the possible issuance of a mining permit, which will allow such operations to be undertaken.

E. Air

The Beartooth Coal Company must meet requirements for construction and operating permits for the coal handling facility as authorized by the Clean Air Act of Montana and rules adopted under it (Section 69-3911, Rule 16-2.14(1)-S1400). Air quality monitoring system would be set up to meet the requirements of the Montana Department of Health and Environmental Sciences, Air Quality Bureau.

Particulate matter (dust), which may be wind aggravated, can offer a safety hazard to personnel through inhalation and decreased visibility and, by coating, limit the usefulness of adjacent vegetation to cattle and wildlife. Area sprinkling and road

wetting will be required as dust control measures, if necessary.

Diesel emissions from the equipment are expected to be insignificant in contributing to air pollution. Equipment noise should be localized. Overburden blasting would not be conducted on the surface. All blasting underground would be in accordance with Federal and State surface and underground blasting regulations and are not expected to contribute significantly to air pollution.

There is always the possibility of coal dust (causing Black Lung disease) and methane gas (deadly) being emitted from the underground ventilation system which cannot be adequately determined prior to ongoing mining operations. These conditions, however, would be monitored and controlled by the Department of Labor and Industry, Safety and Health Bureau.

IV. Biological Environment

A. Terrestrial, Avian and Aquatic Species and Habitats

The Beartooth Coal Corporation contracted ECON Inc. of Helena, Montana, on April 14, 1977, to conduct a three-month Wildlife Reconnaissance Survey during the period April 14, 1977, to June 30, 1977, on their proposed coal mine site according to specifications prepared by the DSL.³

The Montana DSL administers mining regulations and guidelines under the Montana Strip and Underground Mine Reclamation Act (Title 50, Chapter 10, R.C.M. 1947) that requires coal mining companies to submit to the Department studies on vegetation, wildlife and water resources in and around the proposed mining sites.

The study area for the Beartooth coal site was an octagonal shape study area encompassing a two-mile radius (14 square miles) used to ensure coverage of the larger and more mobile species possibly inhabiting the area (Figure 2).

The area was described as a sagebrush-steppe (Artemisia-Agropyron) site (Kuckler 1964). Four square miles were mapped by habitat types. Five habitats were delineated, including Big Sagebrush-Grassland (210), Silver Sagebrush-Grassland (212), Skunkbrush-

Grassland (213), Creek Bottoms (220) and Chokecherry-Rose Draws (230) (Appendix D). The area received a small amount of use by big game animals during the spring season. Mule deer (Odocoileus hemionus) were the most numerous big game animals. Blue grouse (Dendragapus obscurus), Ring-necked Pheasant (Phasianus colchicus) and Hungarian Partridge (Perdix perdix) were present in the intensive portion of the study area but not in great numbers. A pheasant crowing count of 1.8 calls per stop indicated only marginal pheasant habitat. Sage grouse (Centrocercus urophasianus) were found to use the northern portion of the study area on the bench. One sage grouse lek is suspected to occur on the northwestern portion of the 14-square mile study area. Blue grouse apparently used the area as nesting and brooding habitat. Twenty-four species of song birds and eight species of raptors were observed on the area. (Appendix E). Sparrow hawks (Falco sparverius) were the most common raptor. Vesper sparrows (Poocetes gramineus) and western meadowlarks (Sturnella neglecta) were common song-birds. Yellow-belly marmots (Marmota flaviventris) and western deer mice (Peromyscus maniculatus) were common mammals (Appendix F). Only 10 species of benthic (bottom dwelling) invertebrates were found in Virtue Gulch Creek at three sampling stations.

No endangered, rare or threatened animal or plant species were observed on the site. No pronghorn antelope (Antilocapra americana) were observed. It was concluded that the area was probably not well suited for antelope due to the steep and rough terrain. According to local residents, elk (Cervus canadensis) never utilize the area but sometimes migrate out of the mountains to within 5 to 10 miles southwest of the area.

Although their presence was not documented, black bear (Ursus americanus) could wander from the nearby mountains (5 to 10 miles) and feed in the chokecherry-rose draws during autumn. Autumn food habits of black bears are usually high in berries such as chokecherry. No coyotes were observed in the area. Cottontail rabbits were common in the vicinity of Virtue Gulch (Appendix F).

The proposed permit area did not appear to harbor any "critical" wildlife habitat. The amount of disturbance of land by the proposed underground mine is slight (up to



11 acres) compared to other activities such as strip mining or converting rangeland to cropland. Some habitat will be lost, but it will be very minimal. The loss of habitat on this small area should not have a direct effect on the numbers of wildlife on the area. The constant activity of man has steadily reduced the overall habitat for many kinds of wildlife, so the loss of any habitat can have a cumulative effect over a period of time, to a greater or lesser degree.

The small area of disturbance would probably affect birds more than larger species due to their small home ranges. The most significant loss would be some nesting and brooding habitat of game and nongame birds. Of the game birds, the Blue grouse could probably be affected most since some apparently migrate to the area from the nearby mountains to nest and rear their broods in the proposed mine area. Even so, this effect should be minimal to the overall population of Blue grouse in the area, since they have high mobility and fairly large ranges.

B. Vegetation and Agriculture

The entire area consisted mainly of a shrub/foothills habitat. A total of six vegetation types were found to exist within the proposed Brophy Mine permit area. The range sites were, for the most part, found to be in a state of extreme retrogression. Vegetation types 212, 610 and 653 occur in a silty range site. Sites 610 and 653 are both products of extreme surface disturbance resulting from past mining and residential activities (Appendix D). As a result, there is considerable bare ground on both sites.

The Silver Sagebrush-Grassland site (212) was dominant on the steep foothills on unstable loose soils. It was the major habitat type and comprises about 70 percent of the proposed permit area. The dominant grasses are bluebunch wheatgrass, prairie junegrass and Canada Bluegrass. The most common forbs are yarrow, rose pussytoes, common dandelion, western gromwell, silvery lupine and Hood's phlox. Silver sagebrush is the most common shrub.



The Skunkbrush-Grassland habitat type (213) was found on south-facing and south-west-facing slopes north of Virtue Gulch on dry rocky sites and comprises about 10 percent of the area. Only three grasses occurred, and bluebunch wheatgrass is the most dominant. Prairie junegrass and western wheatgrass also occur here. Milkvetch, western gromwell and silvery lupine are the most common forbs. Skunkbush sumac is the dominant shrub.

Creek bottoms habitat type (22) is an area that will be disturbed to some extent. This habitat only comprises about 10 percent of the proposed area. The overstory consists of green ash, cottonwood, some quaking aspen and dense stands of chokecherry and Wood's rose. The two most common grasses are Kentucky bluegrass and green needlegrass. Low sagebrush, Canada thistle, cudweed sagewort and hound's tongue are the more common forbs. The two dominant shrubs are chokecherry and Wood's rose.

The Chokecherry-Rose Draws habitat type (230) is somewhat similar to the creek bottom type, only without the larger trees and running water. It accounts also for about 10 percent of the upper end of the proposed mine area. The overstory is chokecherry and rose and occurs in draws, swales and other mesic spots. The dominant grasses of this site are Kentucky bluegrass, mountain brome, inland bluegrass and Canada bluegrass. Smaller murdock, low sagebrush and sticky geranium are the most common forbs. Again, chokecherry and Wood's rose are the dominant shrubs. A list of other less commonly occurring plants on these habitat types may be seen in Appendix G.

A typical rangeland plant community existing in a climax or near climax state exhibits a plant community relationship dominated by perennial grasses.⁶ Successional variations within these ecosystems are a product of time in conjunction with climatologic edaphic and biologic factors. However, the process becomes interrupted from time to time, either through naturally induced causes (fire, severe storm, etc.) or by various human-related disturbances (site development, overgrazing, etc.).

These disturbances can cause plant retrogression, resulting in a marked change in plant composition favoring increaser and invader species, notably shrubs and grasses,



at the expense of the more desirable decreaser plants.

The range sites existing within the proposed permit area are, for the most part, found to be in a state of extreme retrogression. Deterioration mainly from livestock grazing is evident. The resultant range condition for the entire proposed permit area is poor, and a stocking rate of .15 AUMs to .35 AUMs per acre is all that can be expected at present.⁵

Emphasis, therefore, should be on site enhancement following any further activities in the area. This can best be accomplished by concentrating on major native decreaser species in reclamation planning. Careful reclamation practices will provide an opportunity for the appropriate native species to become reestablished. A suitable permanent, effective and diverse vegetative cover of species native to the area of disturbed land or species that will be capable of meeting the criteria set forth in Section 50-1045, R.C.M. 1947, shall be established on all areas of land affected except roadways or areas of authorized water confinement (Appendix B). Areas shall be planted or seeded during the first appropriate season following completion of grading, topsoil redistribution and remedial soil treatment. Livestock grazing will not be allowed on reclaimed land until the seedlings are established and can sustain managed grazing. Fencing of the area until a firm stand is reestablished may also be necessary to protect the newly reseeded and revegetated areas from livestock depredation.

The success of reclamation will largely determine the length of time wildlife and cattle are affected. With an immediate start, provided ongoing reclamation is successful (seeding over mine entrance and vent shaft), the time interval to create suitable new food and habitat for many species should not exceed two or three years required to establish and protect new cover. However, steep slopes and relative scarcity of available topsoil could limit the success of revegetation.

Beartooth Coal Company would, as rapidly, completely and effectively as the most modern technology and the most advanced state of the art will allow, reclaim and



revegetate the land affected by its operation.¹ Beartooth would utilize the existing five-acre waste site, existing roads and other surface support facilities, such as loadout facilities and storage areas from previous mining and would cause no new disturbances to prevent additional abuse to the area's vegetation.

V. Human Environment

A. Human Health and Safety

The proposed underground mine may emit coal dust and or methane gas, the influence of which as a contribution to respiratory diseases and ailments of the human population in the immediate vicinity of the proposed operation is unknown. Dust abatement and adequate ventilation shafts should mitigate this potential health hazard. In addition to inhalation hazards, an underground mine exposes the entire work force to hazards of such mining accidents as roof falls, coal falls, explosions and cave-ins, none of which can be adequately analyzed prior to mining. In comparing mining methods statistically, fatal and nonfatal accidents in underground mines average five times the rate of strip mine accidents, although the majority of the available coal resources can only be obtained by underground mining methods.⁷

The proposed mine may also constitute an "attractive nuisance" in the area and could cause injury or loss of life to individuals who trespass into the active mining area during the life of the proposed operations. Since the haul road will be open to the public as well, truck traffic from the mine to the dump and storage site could also increase the potential for people-equipment accidents. During mining the creation of a highwall at the mine entrance and at the load-out facilities creates a hazard to personnel and wildlife, notably big game. Should deep holes develop through subsidence after or during mining, the same hazard can exist. Protective fencing may be necessary in these areas to avoid accidents.

Storage of coal is an economic necessity in order to load the large, predetermined quantities of coal on unit trains in a relatively short time. Prolonged storage of



of coal, however, could lead to spontaneous combustion through their tendency to take up large amounts of oxygen when exposed to air.⁸ The coal storage facility has been designed small enough to avoid dead storage of coal to minimize the possibility of spontaneous combustion.

Beartooth will be required to comply with standards and regulations imposed by the Occupational Safety and Health Administration (OSHA), the Mining Enforcement and Safety Administration. (MESA) and the Department of Labor and Industry, Safety and Health Bureau.

B. Income, Employment and Taxes

An economy, no matter how small or isolated, is composed of many complex and interrelated relationships between and among people, business and resources. The impact of new activities on a local area may be analyzed only if these underlying relationships and preexisting conditions are kept in mind.

This particular operation seems to represent "desirable development" (payrolls and tax revenues) without "undesirable growth" (crowding and inflated prices). Beartooth Coal Company anticipates a work force of about 12 to 17 men during full production, which could amount to a total salary of \$282,700 per year at the present pay scale (Beartooth Coal estimates). The company anticipates contracting a local trucking firm to haul their coal to Bridger, Montana, which would add approximately \$150,000 per year to the local economy, excluding incidental revenues of gasoline taxes and road maintenance improvements.

The income from the enterprise will generate personal and corporate income taxes for state and federal governments. There will be increased property tax revenues for local government, plus severance tax, resource indemnity tax and abandoned mine reclamation tax that will be generated. Precise amounts will be subject to actual tonnages mined and legislation then current. Based on present estimated capital and operating costs, it appears that the mine will contribute

property taxes to the county in the range of \$200,000 annually based on projected 100,000 tons of coal produced per year. There will also be the additional property and income taxes paid individually by the workers. Beartooth has already paid back taxes on the coal mine amounting to about \$90,000 over the past three years.

Beartooth Coal will provide considerable income to the state of Montana and to Carbon County in the form of tax revenues. Table 1, below, gives estimates of projected 1979 taxes based on a 100,000 ton yearly production.

Table 1 - Estimated 1979 taxes accrued - Beartooth Coal Mine⁽¹⁾

<u>Resource Indemnity⁽²⁾</u>	<u>Property⁽³⁾</u>	<u>Severance⁽⁴⁾</u>	<u>Abandoned Mine Reclamation Fund⁽⁵⁾</u>	<u>Black Lung Insurance^{(6)*}</u>
\$12,500	\$205,000	\$100,000	\$15,000	\$45,232

(1) Estimates provided by Beartooth Coal Co.

(2) To the state calculated as 1/2 of 1% of sales ($.005 \times \$25.00 \times 100,000 = \$12,500/\text{yr}$).

(3) Mostly to the county, as a rule of thumb, 98% of all property taxes go to local government (varies with mill levy). This is estimated on 1978 mill levy.

(4) The coal severance tax, based on 4% of sales, provides revenues for state general fund and to eight other funds ($.04 \times \$25.00 \times 100,000 = \$100,000/\text{yr}$).

(5) Surface Mining Control and Reclamation Act effective since August 3, 1977, provides \$.35 per ton of surface mined coal and \$.15 per ton of coal produced by underground mining to a general fund available to states upon request and reclamation need.

(6) Black Lung Insurance is paid on 16% of payroll. ($.16 \times \$282,700 = \$45,232/\text{yr}$).

*Not a true tax.



Approval of this permit by the Department will undoubtedly increase the coal generated tax revenue to both Carbon County and the state of Montana.

C. Archaeology and History

Coal mining began in the Red Lodge-Bearcreek area in 1877. Many small communities sprang up around the coal mines and near the more fertile valley soils. These mines contained a high grade of subbituminous coal. In 1910, the area's heyday, 1600 miners were employed to produce coal for the Northern Pacific Railway and the Anaconda Smelter. The mining was extremely difficult because of the varying dips and the fragmentation of the seams. Some production figures during that era are: 1924 - 1,487,697 tons; 1925 - 921,172 tons; 1931 - 403,017 tons; and 1939 - 308,182 tons. The mines began to close in the early 1940s due to the decline in usage of coal in favor of diesel fuels and natural gas. An explosion, reportedly gas caused, occurred in 1943 in the Montana Coal and Iron B Smith Mine killing 74 Bearcreek coal miners. This accelerated the mine closings. The Brophy Mine was the last of the underground operations to close in 1959.⁹

A two-day archaeological survey under the direction of Dr. Leslie Davis, Ph.D., Bozeman, Montana, was conducted on the proposed permit area in January and March 1978. The results of that survey are contained in Appendix H. His ground-truth foot reconnaissance of the erosional surfaces, trails, and road and stream cuts yielded no trace of early historic or prehistoric activity at any location, including those modified by prior land users.

In an effort to preserve some of the ethnic and grassroot heritage, which is so often lost through apathy and neglect, Beartooth Coal Company has elected to abandon their demolition plans and renovate for offices the existing Brophy residential stone buildings in an attempt to protect and preserve them for posterity. These buildings reveal stone structures of more than average architectural merit and might well have been constructed by one of the ethnic groups of stone masons (Appendix H).



D. Aesthetics

It should be recognized that industrial properties in semi-remote areas do have a certain potential for viewing and public education. Partial mitigation will be obtained through revegetation in reclamation. Since this is an underground mine and, since it will disturb a small surface area, the potential aesthetic impact is insignificant considering the fact that it is not adjacent to or within view of any residential homesites, subdivisions or major highways.

E. Transportation

This proposed permit area is in the foothills of the Beartooth Mountains. Carbon County alternate Route 308, a gravel county road, bisects the permit area and will be used to haul coal to Bridger, Montana, a distance of about 25 miles. This proposed permit agreement does not transfer the right-of-way or restrict the use of the road to the public. There will be no new haul roads pertaining to this operation and alternate 308 will be maintained by Beartooth Coal Company.¹

E. Future Projections and Demands

Economic projections have been made, but long-term planning and analysis are still needed. The current period is one of extreme uncertainty and change with respect to energy use in this country. A few more years will answer many questions concerning sulfur scrubbers, nuclear power, and the effect of price increases on energy consumption--all of which will influence the course of coal development in Montana. As these issues are resolved, the time horizon for reasonably accurate economic projections can be extended. To predict, project or in any way prejudice what might be of crucial significance in future productivity implies a capability beyond that of current scientific knowledge and the limits of this PER.

In short, there are no iron-clad guarantees concerning the long-run viability of coal-related development. The demand for Montana coal and power may decline someday



but not all at once; indeed the risk of a coal bust may be no greater than the chance of a precipitous decline in tourism, dependent as it is upon the uncertainties and increasingly expensive sources of fuel. Very few industrial developments carry with them assurances of long-term permanence.



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4. Coal Development Potential in Eastern Montana, Environmental Quality Council, January 7, 1972.
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RESOURCE CONSULTANTS, INC.

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P.O. Box 593 □ Billings, Montana 59103

LABORATORY REPORT

Lab. No. 14058

To Beartooth Coal Company c/o Joe Rawlins

Date 11-21-77

Address 310 Securities Building

Billings, Montana 59101

SOIL/OVERBURDEN ANALYSISBrophy Mine
SE SE 36-7S-20E
Carbon County, Montana
Samples Submitted 11-15-77MECHANICAL ANALYSIS

(Physical Composition and Texture)

SAMPLE IDENTIFICATION	--SOIL COMPONENT, %--			TEXTURE (USDA NOMENCLATURE)
	SAND	SILT	CLAY	
1. 0-5'	60	22	18	Sandy Loam
2. 5-10'	58	22	20	Sandy Loam
3. 10-15'	46	26	28	Sandy Clay Loam
4. 15-20'	52	26	22	Sandy Clay Loam
5. 20-25'	54	22	24	Sandy Clay Loam



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LABORATORY REPORTLab. No. 14058To Beartooth Coal Company c/o Joe Rawlins Date 11-21-77Address 310 Securities Building Billings, Montana 59101SOIL/OVERBURDEN ANALYSIS

Brophy Mine
SE SE 36-7S-20E
Carbon County, Montana
Samples Submitted 11-15-77

CHEMICAL ANALYSIS

(DTPA Extractable)

-----Parts per million in air dried sample-----

<u>SAMPLE IDENTIFICATION</u>	<u>ZINC</u>	<u>IRON</u>	<u>MANGANESE</u>	<u>COPPER</u>	<u>CADMIUM</u>	<u>LEAD</u>	<u>NICKEL</u>
1. 0-5'	0.98	153	115	3.75	0.03	1.94	1.45
2. 5-10'	0.64	19	22	3.29	<0.01	0.92	0.46
3. 10-15'	0.62	341	232	7.45	0.02	2.23	3.78
4. 15-20'	0.41	161	171	3.65	0.02	0.99	2.25
5. 20-25'	0.68	111	157	4.04	0.03	1.38	1.42



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RESOURCE CONSULTANTS, INC.

(formerly YAPUNCICH, SANDERSON & BROWN LABS)

Phone (406) 252-6325 113 North 32nd Street
P.O. Box 593 Billings, Montana 59103**LABORATORY REPORT**Lab. No. 14306-3To Beartooth Coal CompanyDate 4-18-78Address P.O. Box 2110Red Lodge, Montana 59068**SPOIL PILE SAMPLE ANALYSIS**Sample Submitted 4-7-78
by Dennis Kosh

SATURATED

SOIL PASTE

-----SATURATED SOIL EXTRACT-----

pH	SATURATION PERCENT	SPECIFIC CONDUCTANCE mmhos/cm	SODIUM		CALCIUM		MAGNESIUM		SAR
			meq. per liter	100 gms*	meq. per liter	100 gms*	meq. per liter	100 gms*	
3.0	66.0	3.05	1.91	0.13	26.95	1.78	6.58	0.13	0.47

* oven dry sample

MECHANICAL ANALYSIS

(Physical Composition and Texture)

-----SOIL COMPONENT, %-----

SANDSILTCLAYTEXTURE
(USDA NOMENCLATURE)

94

2

4

Sand

MEMO

TO: Beartooth files
FROM: Dennis Kemmer
RE: Seed Mixture
DATE: June 1, 1978

As a result of the unavailability of seed for certain species, the Beartooth seed mixture was altered to the following:

Species	Broadcast rate in P.L.S.	Drill rate in P.L.S.
Thickspike wheatgrass	6	4
Slender wheatgrass	4	2
Green needlegrass	4	2
Beardless wheatgrass	4	2
Tall fescue	8	4
Big bluegrass	4	2
Sainfoin	2	1
Tall wheatgrass	4	2

SD

cc: Chuck Law



ENERGY & ENVIRONMENTAL

RESOURCE CONSULTANTS, INC.

(Formerly YAPUNCICH, SANDERSON & BROWN LADS)

Phone (406) 252-6325 13 North 32nd Street
P.O. Box 593 Billings, Montana 59103

LABORATORY REPORT

Lab. No. 14306-2

To Beartooth Coal Company

Date 4-18-78

Address P.O. Box 2110

Red Lodge, Montana

59068

SPECIAL WATER ANALYSIS

Mine Water

Sample Submitted 4-7-78

by Dennis Kosh

CONSTITUENTDISSOLVEDmg./l.meq./l.

Potassium (K) -----	12 -----	0.31
Sodium (Na) -----	180 -----	7.82
Calcium (Ca) -----	386 -----	19.26
Magnesium (Mg) -----	203 -----	16.69
Sulfate (SO ₄) -----	1,798 -----	37.45
Chloride (Cl) -----	11 -----	0.31
Carbonate (CO ₃) -----	0 -----	0.00
Bicarbonate (HCO ₃) -----	390 -----	6.39
Fluoride (F) -----	0.24 -----	0.01
Orthophosphate (PO ₄) as P (total) --	0.02 -----	
Nitrate (NO ₃) + Nitrite-N (total) --	1.8 -----	0.13

Specific Conductance -----

2,970 micromhos/cm @ 25°C

Turbidity -----

4.6 JTU

Total Suspended Solids -----

11 mg./l.

Total Alkalinity as CaCO₃ -----

320 mg./l.

Total Acidity -----

0 mg./l.

Sodium Absorption Ratio -----

1.8

pH ----- 7.6

mg./l.mg./l.

Aluminum (Al) -----	0.36	Mercury (Hg) -----	0.0002
Iron (Fe) -----	0.010	Selenium (Se) -----	0.002
Manganese (Mn) -----	0.15	Vanadium (V) -----	0.04
Cadmium (Cd) -----	0.003	Nickel (Ni) -----	0.05
Copper (Cu) -----	0.020	Molybdenum (Mo) -----	0.016
Lead (Pb) -----	0.01	Arsenic (As) -----	0.002
Zinc (Zn) -----	0.028	Boron (B) -----	0.19
Chromium (Cr) -----	0.004		

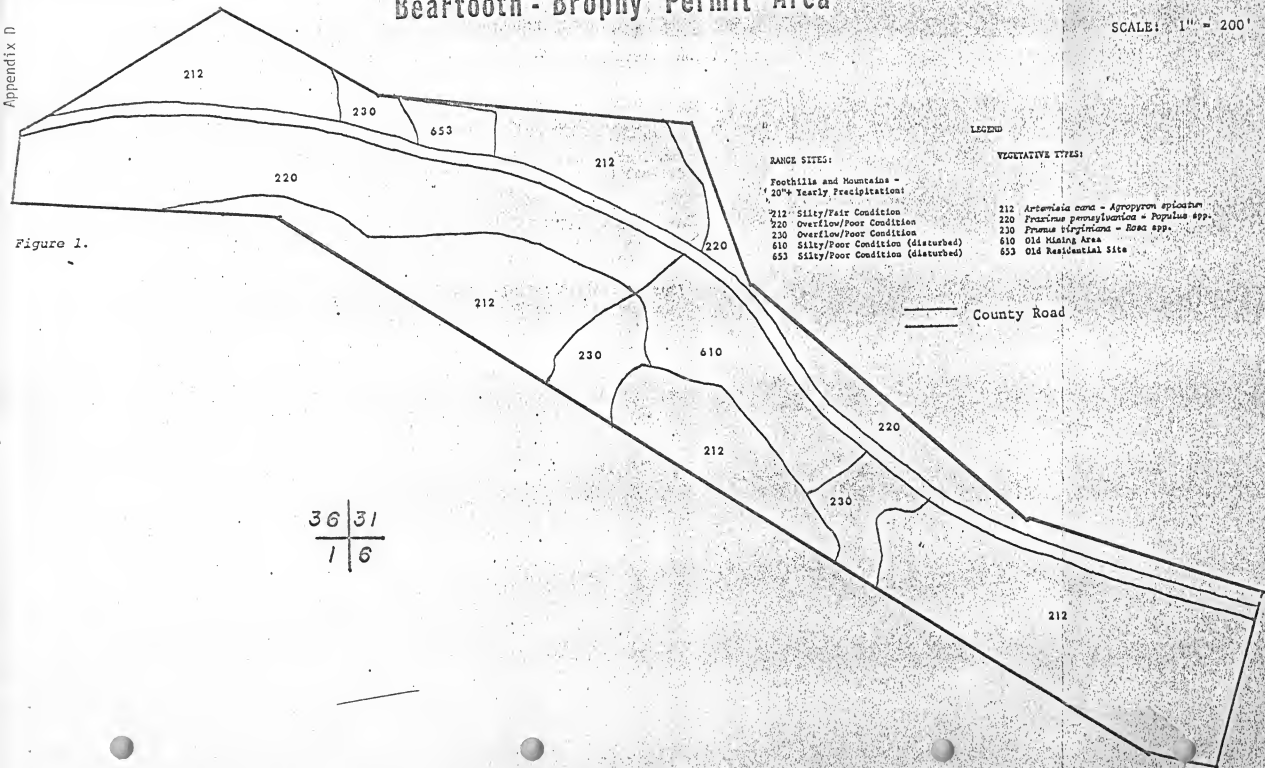


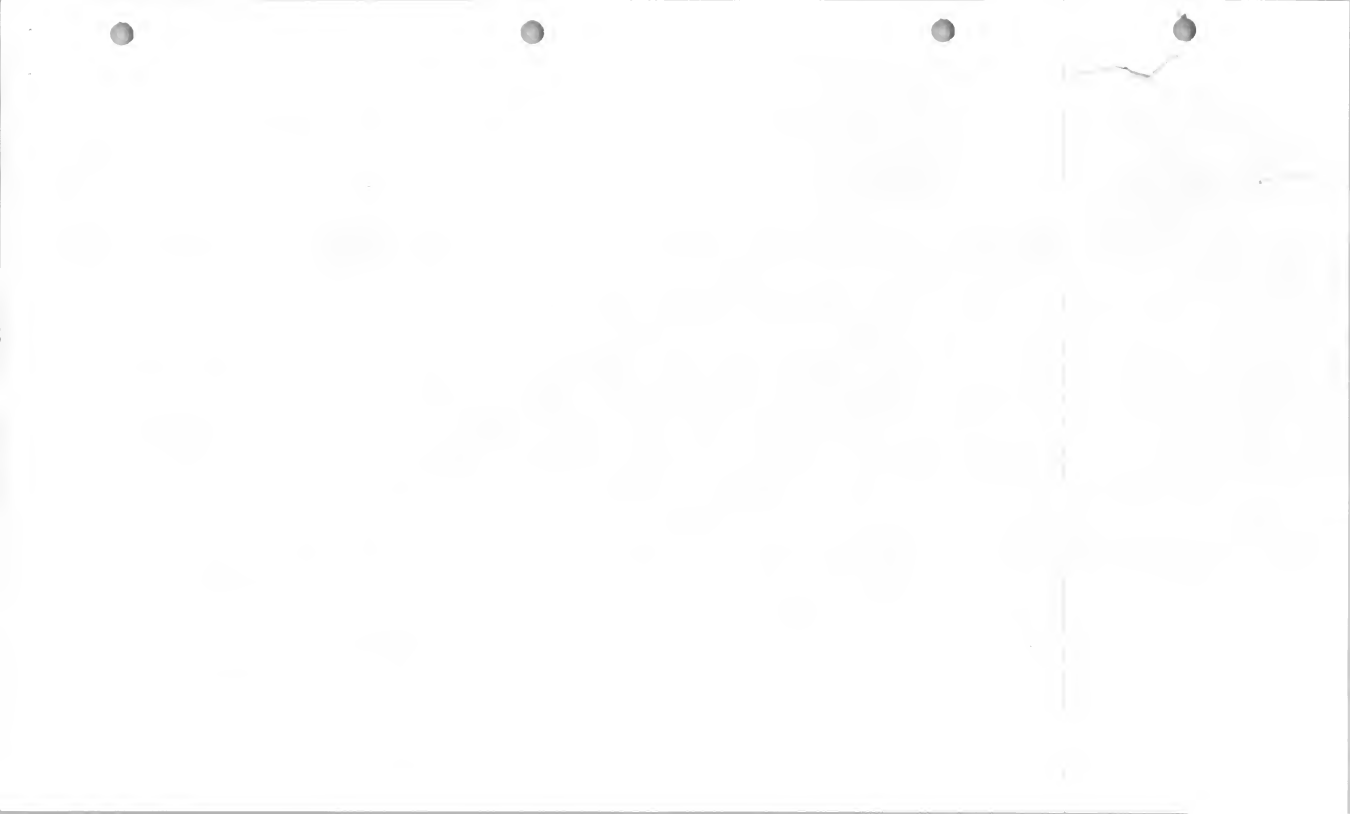
Beartooth - Brophy Permit Area

SCALE: 1" = 200'



Figure 1.





ABUNDANCE AND HABITAT PREFERENCE OF SONG BIRDS OBSERVED
ON THE STUDY AREA DURING THE SPRING OF 1977.

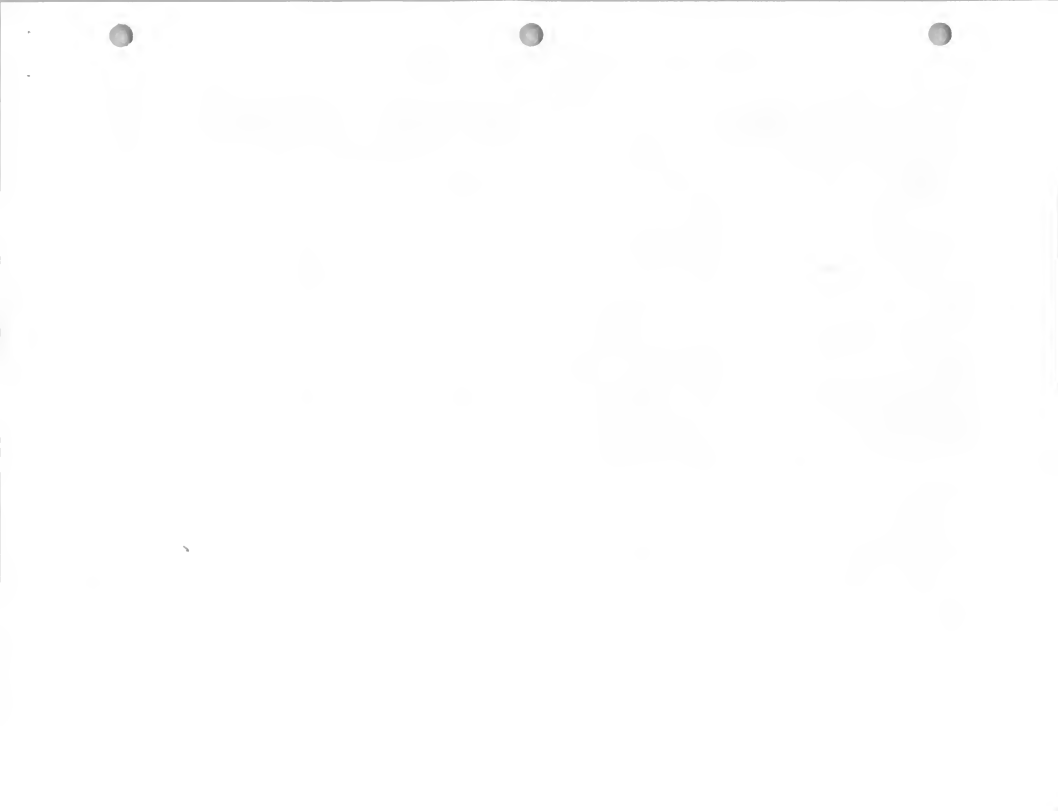
SPECIES		ABUNDANCE ¹			HABITAT PREFERENCE ^{2, 3}					
Scientific Name	Common Name	Rare	Comm.	Uncom.	111	210	220	230	651	Other ⁴
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	X					X			
<i>Charadrius vociferous</i>	Killdeer	X					X			
<i>Colaptes cofer</i>	Red-shafted Flicker	X					X			
<i>Columba livia</i>	Rock Dove	X							X	
<i>Corvus corax</i>	Common Raven			X	X					
<i>Corvus brachyrhynchos</i>	Common Crow		X		X	X				
<i>Eremophila alpestris</i>	Horned Lark	X			X	X				
<i>Euphagus cyanocephalus</i>	Brewer's Blackbird	X			X	X	X	X	X	
<i>Hirundo rustica</i>	Barn Swallow						X			X
<i>Icterus bullockii</i>	Bullock's Oriole		X			X	X	X		
<i>Lanius ludovicianus</i>	Loggerhead Shrike		X			X		X	X	
<i>Pica pica</i>	Magpie	X			X	X	X			
<i>Pipilo erythrophthalmus</i>	Rufous-sided Towhee		X					X		
<i>Poocetes gramineus</i>	Vesper Sparrow	X			X	X		X		
<i>Quiscalus quiscula</i>	Common Grackle	X			X	X	X	X		
<i>Sialia currucoides</i>	Mountain Bluebird		X			X				
<i>Spiella arborea</i>	Tree Sparrow		X				X			
<i>Stelgidopteryx ruficollis</i>	Rough-winged Swallow	X				X	X		X	X
<i>Sturnella neglecta</i>	Western Meadowlark	X			X	X	X	X		
<i>Sturnus vulgaris</i>	Starling		X				X		X	
<i>Troglodytes aedon</i>	House Wren	X				X	X	X		X
<i>Turdus migratorius</i>	Robin	X			X	X	X	X		
<i>Tyrannus tyrannus</i>	Eastern Kingbird		X				X	X		
<i>Zenaidura macroura</i>	Mourning Dove	X			X	X	X	X		

¹Based on numbers observed during study.

²Based on habitat birds were observed in.

³111 = grassland; 210 = shrubland; 220 = creek bottoms; 230 = rose-chokecherry draws; 651 = disturbed areas.

⁴Bridges, abandoned mines and buildings.



LIST OF WILDLIFE SPECIES OBSERVED DURING SPRING OF 1977

	<u>Scientific Name</u>	<u>Common Name</u>
Game Animals:	<i>Anas platyrhynchos</i>	Mallard
	<i>Centrocercus urophasianus</i>	Sage grouse
	<i>Dendragapus obscurus</i>	Blue grouse
	<i>Odocoileus hemionus</i>	Mule Deer
	<i>Odocoileus virginianus</i>	White-tailed Deer
	<i>Perdix perdix</i>	Hungarian partridge
	<i>Phasianus colchicus</i>	Ring-necked pheasant
Small Mammals:	<i>Canis latrans</i>	Coyote
	<i>Erethizon dorsatum</i>	Porcupine
	<i>Marmota flaviventris</i>	Yellowbelly marmot
	<i>Microtus ochrogaster</i>	Prairie vole
	<i>Microtus pennsylvanicus</i>	Meadow vole
	<i>Peromyscus maniculatus</i>	Western deer mouse
	<i>Spermophilus</i> spp.....	Richardson's ground squirrel
	<i>Sylvilagus</i> spp.....	Cottontail
Raptors:	<i>Aquila chrysaetos</i>	Golden eagle
	<i>Bubo virginianus</i>	Great horned owl
	<i>Buteo jamaicensis</i>	Red-tailed hawk
	<i>Buteo lagopus</i>	Rough-legged hawk
	<i>Circus cyaneus</i>	Marsh hawk
	<i>Falco columbarius</i>	Pigeon hawk
	<i>Falco mexicanus</i>	Prairie falcon
	<i>Falco sparverius</i>	Sparrow hawk
Song Birds:	<i>Agelaius phoeniceus</i>	Red-winged blackbird
	<i>Charadrius vociferus</i>	Killdeer
	<i>Colaptes cafer</i>	Red-shafted flicker
	<i>Columba livia</i>	Rock dove
	<i>Corvus corax</i>	Common raven
	<i>Corvus brachyrhynchos</i>	Common crow
	<i>Eremophila alpestris</i>	Horned lark
	<i>Euphagus cyanocephalus</i>	Brewer's Blackbird
	<i>Hirundo rustica</i>	Barn swallow
	<i>Icterus bullockii</i>	Bullock's oriole
	<i>Lanius ludovicianus</i>	Loggerhead shrike
	<i>Pica pica</i>	Magpie
	<i>Pipilo erythrophthalmus</i>	Rufous-sided towhee
	<i>Poocetes gramineus</i>	Vesper sparrow

(Continued)



List of Wildlife Species Observed During Spring of 1977 (Continued)

	<u>Scientific Name</u>	<u>Common Name</u>
Song Birds (Cont.)	<i>Quiscalus quiscula</i>	Common grackle
	<i>Sialia currucoides</i>	Mountain bluebird
	<i>Spizella arborea</i>	Tree sparrow
	<i>Stelgidopteryx ruficollis</i>	Rough-winged swallow
	<i>Sturnella neglecta</i>	Western Meadowlark
	<i>Sturnus vulgaris</i>	Starling
	<i>Turdus migratorius</i>	Robin
	<i>Tyrannus tyrannus</i>	Eastern kingbird
	<i>Zenaidura macroura</i>	Mourning dove



List of Plant Species¹Scientific NameCommon Name

GRASSES:

<i>Agropyron smithii</i>	Western wheatgrass
<i>Agropyron spicatum</i>	Bluebunch wheatgrass
<i>Agropyron trachycaulum</i>	Slender wheatgrass
<i>Bromus japonicus</i>	Japanese brome
<i>Bromus marginatus</i>	Mountain brome
<i>Festuca idahoensis</i>	Idaho fescue
<i>Koeleria cristata</i>	Prairie junegrass
<i>Poa compressa</i>	Canada bluegrass
<i>Poa cusickii</i>	Cusick bluegrass
<i>Poa interior</i>	Inland bluegrass
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Stipa viridula</i>	Green needlegrass

FORBS:

<i>Achillea millefolium</i>	Common yarrow
<i>Alyssum alyssoides</i>	Pale alyssum
<i>Antennaria rosea</i>	Rose pussytoes
<i>Arctium minus</i>	Smaller burdock
<i>Artemisia arbuscula</i>	Low sagebrush
<i>Artemisia frigida</i>	Fringed sawwort
<i>Artemisia ludoviciana</i>	Cudweed sawwort
<i>Astragalus drummondii</i>	Drummond milkvetch
<i>Astragalus</i> spp.....	Milkvetch
<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium undulatum</i>	Wavyleaf thistle
<i>Crepis</i> spp.....	Hawksbeard
<i>Cynoglossum officinale</i>	Hound's Tongue
<i>Geranium viscosissimum</i>	Sticky geranium
<i>Geum triflorum</i>	Prairie smoke
<i>Glycyrrhiza lepidota</i>	Wild licorice
<i>Linum perenne</i>	Blue flax
<i>Lithospermum ruderale</i>	Western gromwell
<i>Lomatium cous</i>	Mountain biscuitroot
<i>Lupinus argenteus</i>	Silvery lupine
<i>Medicago lupulina</i>	Black medic
<i>Phlox hoodii</i>	Hood's phlox
<i>Phlox multiflora</i>	Flowery phlox
<i>Ratibida columiflora</i>	Prairie coneflower
<i>Rumex crispus</i>	Curl dock
<i>Sphaeralcea coccinea</i>	Scarlet globemallow
<i>Taraxacum officinale</i>	Common dandelion
<i>Tragopogon dubius</i>	Common salsify
<i>Vicia americana</i>	American vetch

(Continued)



- List of Plant Species (Continued)

<u>Scientific Name</u>	<u>Common Name</u>
Shrubs:	
<i>Artemisia cana</i>	Silver sagebrush
<i>Chrysothamnus nauseosus</i>	Rubber rabbitbrush
<i>Gutierrezia sarothrae</i>	Broom snakeweed
<i>Prunus virginianus</i>	Chokecherry
<i>Rhus trilobata</i>	Skunkbush sumac
<i>Ribes setosum</i>	Redshoot gooseberry
<i>Rosa woodsii</i>	Wood's Rose
<i>Symphoricarpos occidentalis</i>	Western snowberry

¹Taken from transect data.

